

Article Title: How you should read research papers according to Andrew Ng

The main idea of this article

- A systematic approach to reading a collection of papers to gain knowledge within a domain
- How to properly read a research paper
- Useful online resource that can aid you in searching for papers and key information

Andrew Ng

- The most well-known machine learning teacher on the internet
- Co-founder of both DeepLearning.ai and Coursera
- Professor at Stanford University

Reading Research Papers

1. Assemble collections of resources that focus on the subject matter. Resources can come in the form of research papers, Medium articles, blog posts, videos, GitHub repository etc.
  - a. Use your favourite search engine (ex. Google, Bing, etc.) the subject and collect as many resources as possible
2. Conduct a deep dive of any resource you deem relevant to the subject matter
  - a. Important method: To track understanding of each shortlisted resources.
  - b. Andrew's suggestions:
    - i. Have a table of resources plotted against your understanding level

Resource	10% - 20%	20% - 40%	40% - 60%	60% - 80%	80% - 100%
ResourceLink1	Check	Check			
ResourceLink2	Check	Check	Check		

3. Take structured notes that summarises the key discoveries, findings and techniques within a paper, in your own words

Reading a single Research Papers

Go through the paper 3 times

4. 1<sup>st</sup> pass: Start with reading the sections within the paper: title, abstract and figures
5. 2<sup>nd</sup> pass: Then read these sections within the paper: introduction, conclusion.
  - a. Scan through the rest of the content
  - b. Both introduction and conclusion of the paper contains a brief main idea of the paper.
6. 3<sup>rd</sup> pass: reading through the whole sections but skip any maths/technique formulations that might be alien to you
  - a. Also: skip any terms and terminologies that you do not understand or aren't familiar
7. Additional pass: focus on an understanding of the math, techniques and unknown terminologies presented within the paper.
  - a. For those who read research papers for informational and engineering purposes
    - i. In-depth research might be very time consuming

## Questions to Ask Yourself

Question below will help us understand the critical information present in the paper.

They are as follow:

1. Describe what the author is aiming to accomplish in the paper
  - a. Describe what they did achieve to discuss
2. If there is a new technique/approach been introduced to the paper, what are the key elements of the newly proposed approach?
3. What content within the paper is useful to you?
4. What other references do you want to follow?

## Additional Resources To assist Research

- The machine learning Subreddit
  - <https://www.reddit.com/r/MachineLearning/>
- The Deep learning Subreddit
  - <https://www.reddit.com/r/deeplearning/>
- PapersWithCode
  - <https://paperswithcode.com/>
- Top conferences
  - NIPS
    - <https://papers.nips.cc/>
  - ICML
    - <https://icml.cc/>
  - ICLR
    - <https://iclr.cc/>
- Research Gate
  - <https://www.researchgate.net/>

## Conclusion

“Learn steadily rather than short burst for longevity.” – Andrew Ng

- If an individual is consistent in their search for knowledge (regardless of the domain), then they’ll be rewarded with an understanding that surpasses the norm.
- This technique will require discipline to master, but it will provide you with a great advantage to your life long journey of learning.